

2.2 TRAFFIC AND TRANSPORTATION ISSUES

2.2.1 Affected Environment

2.2.1.1 Before the Security Action

The transportation system in the vicinity of the White House includes the street and sidewalk network, a segment of the Metrorail regional rail transit system, Metrobus routes, and both on- and off-street parking. Major uses of the transportation system include not only the general personal travel and goods movement that would exist in any city but also a large number of tourists and related activities. Characteristics of the transportation system were documented in the report, *Analysis of Transportation Conditions After Traffic Restriction and Street Modifications in the Vicinity of the White House*, published by the Federal Highway Administration in May 1997, and referred to here as the FHWA transportation analysis. The following information is derived from that analysis.

Street Network

The street network is a portion of the urban grid in downtown Washington, including east-west and north-south streets and diagonal avenues. The network is less dense than in most of downtown Washington because the White House grounds and Lafayette Square are larger than the typical downtown block. The street network reflects the L'Enfant Plan concept for Washington D.C., although operational changes, including a variety of traffic restrictions and one-way operations have been made to some streets over the years. Pennsylvania Avenue between 15th and 17th Streets was not in the L'Enfant Plan; this segment of the avenue was officially added in 1824. Lower E and F Streets west of the White House and I and L Streets had been made one-way eastbound streets. Upper E and G Streets west of the White House and M Street had been made one-way westbound. In addition, 12th, 18th, 20th, and 22nd Streets were one-way northbound and 19th and 21st Streets were one-way southbound. Portions of Connecticut Avenue and 15th and 17th Streets operated as one-way streets during some hours on weekdays. Traffic had already been restricted on other streets in the vicinity of the White House, as described in Chapter 1.0.

Traffic Volumes

Traffic data for conditions before the security action are not complete because there was no opportunity for the systematic collection of data before the security action. Some historic traffic data exist and were used to the extent possible. The most recent average weekday traffic volumes that are available for the downtown area before the action are from DCDPW counts in 1993. No comprehensive, consistent set of intersection turning-movement data are available, but traffic counts taken between June 1990, and January 1995, are available for 16 intersections in the extended study area.

Before the security action, the streets that were affected carried high volumes of traffic. The 1993 daily traffic volumes show the magnitude of these traffic flows. The east-west streets between and including K Street and Constitution Avenue carried 143,000 vehicles on an average weekday (based on 1993 counts). Pennsylvania Avenue carried about 26,000 vehicles per day and westbound E Street carried about 12,000, for a total of approximately 38,000 vehicles per day. This was 26.5 percent of the average weekday east-west traffic between K Street and Constitution Avenue. H and I Streets together carried 27,500 vehicles, or 19.2 percent of the traffic. Table 2-1, drawn from the FHWA transportation analysis, shows historical average weekday east-west traffic volumes.

Table 2-1
Average Weekday East-West Traffic Volumes Before the Security Action^{1/}

Street	AWT (thousands)	Percent
K Street	25.5	17.8%
I Street	13.5	9.4%
H Street	14.0	9.8%
Pennsylvania Avenue	26.0	18.1%
E Street	23.0	16.1%
Constitution Avenue	<u>41.2</u>	<u>28.8%</u>
Total	143.2	100.0%

Source: DCDPW, Bureau of Traffic Services 1993, AWT
 AWT - average weekday traffic volumes
^{1/} between 15th and 17th Streets

Public Transportation

Public transportation services in the extended study area include the Metrorail Red Line, which runs under Connecticut Avenue, Lafayette Square, and G Street, and the Orange and Blue lines, which run under I Street. Metrobus routes operated on many of the streets in the extended study area. Nine Metrobus routes operated on Pennsylvania Avenue between 15th and 17th Streets before the security action. One additional route used Madison Place and Pennsylvania Avenue between Madison and 15th Street. The Washington Metropolitan Area Transit Authority (WMATA) reported that the total daily number of bus trips on the routes at the time of the security action was 497 on each weekday, 310 on Saturday, and 222 on Sunday.

Tourbuses

Because of the attraction of the White House to tourists, many tour buses operate in the area, although no data on their numbers exist. The FHWA transportation analysis describes two basic types of tour-bus operations in the vicinity of the White House. One type is a scheduled service on a fixed route that in some cases combines sight-seeing opportunities with a local-circulation service among tourist sites. The second type is a group tour that typically operates on a less rigid schedule or no set schedule, and provides access to the tourist sights for a designated group of people. This second type of operation includes charter operations that bring people to Washington from outside the area as well as local operations that provide regular sight-seeing tours for residents and tourists who have arrived by other means.

Buses in each type of operation traveled on both Pennsylvania Avenue and E Street to provide views of the White House and in some cases to serve as a drop-off location for people who wished to walk around the area. Some group-tour operators take each group to a tourist site such as the White House and allow the group time off the bus at that location while the bus waits for them. Bus parking close to tourist sites is one of the most important needs for these group-tour operators.

Parking and Building Access

One of the important functions of the downtown street system is to provide vehicular access to buildings, both for the commercial vehicles making deliveries to business establishments and for parking private vehicles. The FHWA transportation analysis found that the number of parking meters on the streets within the area of the vehicular traffic restriction or operational modifications was 1,610 before the security action. In the vicinity of the White House, there are 23 off-street parking lots or garages, operated by at least 12 parking operators.

2.2.1.2 After the Security Action

The May 20, 1995, security action restricted vehicular traffic on certain portions of streets

contiguous to the perimeter of the White House Complex. Metro buses were allowed to operate on Madison Place following the security action until June 1996. Pedestrian and bicycle traffic was not restricted.

On June 24 and 25, 1995, the District of Columbia Department of Public Works (DCDPW), Bureau of Traffic Services, implemented a set of traffic management response actions. These included modifications to street operations in the vicinity in an attempt to compensate for the reduction in east-west street capacity. H Street between Pennsylvania Avenue and New York Avenue was modified from a two-way street to a one-way eastbound street. I Street between Pennsylvania Avenue and New York Avenue was modified from a one-way eastbound street to a one-way westbound street. Fifteenth Street between New York Avenue / Pennsylvania Avenue and K Street was modified from a two-way street to a one-way northbound street. Later, DCDPW returned 15th Street to two-way traffic south of H Street to reduce traffic congestion and to accommodate revised Metrobus routes due to the closure of Madison Place. The June traffic management response actions included allowing public vehicular access to the portion of Pennsylvania Avenue immediately west of 15th Street to provide direct access to the Pennsylvania Avenue entrances of the Riggs National Bank and NationsBank. On-street parking in front of the banks was permitted and a temporary turnaround was created on Pennsylvania Avenue. There is more parking in this area now than there was before the security action.

2.2.2 Impacts Analysis

2.2.2.1 Analysis of Impacts on Traffic Patterns

The vehicular traffic restriction on Pennsylvania Avenue and E Street caused the shift of east-west traffic from these streets to other east-west streets in the area. The 24-hour traffic counts conducted in July 1995, described in the FHWA transportation analysis, indicate that the primary east-west streets through the extended study area carried approximately 157,600 vehicles per day, approximately 9.5 percent more than the 1993 average weekday volume of 143,200. This increase is unrelated to the security action. To allow a comparison of the percent change in the volume on each primary street in the downtown, the 1993 average weekday volumes were adjusted in the FHWA transportation analysis to reflect July traffic conditions, with the assumption that downtown seasonal traffic patterns have been consistent over the past few years.

Table 2-2, reproduced from the FHWA transportation analysis, shows traffic volumes before and after the security action and the traffic management responses. The table also shows the change in traffic on each primary east-west street between Constitution Avenue and K Street. The 1993 data describing conditions before the security action were adjusted in the FHWA transportation analysis to allow comparisons with the counts taken after the security action and traffic management responses in 1995. The changes in traffic volumes indicate the shifts in overall traffic patterns.

Table 2-2 shows that the largest increase in traffic occurred on Constitution Avenue, which

carries an additional 23,000 vehicles, or approximately 50 percent more than before the security action. The H and I Streets one-way pair had a 34 percent increase and K Street a 31 percent increase. Constitution Avenue and K Street presently carry over two-thirds of the east-west traffic, as compared to slightly less than one-half prior to the security action. These new patterns of traffic are consistent for daily, morning, midday, and afternoon conditions.

Table 2-2

Changes in Traffic Volumes on Primary East-West Streets^{1/}

Street	Before ^{2/}		After		Change	
	AWT	Percent	AWT	Percent	AWT	Percent
K Street	28.1	17.8%	36.5	23.2%	+ 8.4	+ 31.1%
H Street & I Street	30.2	19.2%	40.7	25.8%	+ 10.5	+ 34.4%
Pennsylvania Avenue	28.7	18.2%	0.0	0.0%	-28.7	-100.0%
E Street westbound	13.2	8.4%	0.0	0.0%	-13.2	-100.0%
E Street eastbound	12.0	7.6%	12.0	7.6%	0.0	0.0%
Constitution Avenue	<u>45.4</u>	<u>28.8%</u>	<u>68.4</u>	<u>43.4%</u>	+ 23.0	+ 50.7%
Total	157.6	100.0%	157.6	100.0%		

AWT average weekday traffic volume in thousands

^{1/} Between 15th and 17th Streets

^{2/} Adjusted to 1995 traffic conditions

Traffic on the primary north-south streets also shifted because of the security action and the traffic management responses. Table 2-3, also reproduced from the FHWA transportation analysis, shows traffic volumes before and after the security action and traffic management responses, and the change in traffic, on the primary north-south streets where traffic information was available, from 11th Street on the east to 21st Street on the west.

As expected, Table 2-3 indicates that the shifts in traffic among the north-south streets were smaller than the shifts among the east-west streets. Although 15th Street was modified from a two-way to a one-way northbound street between Pennsylvania Avenue and K Street, it carries about the same number of vehicles as when it had two-way flow. Fourteenth Street had the greatest change in the number of vehicles, probably due to the loss of southbound travel on 15th Street. There was some shifting of north-south traffic on the streets between 18th and 21st Streets; however, the total percentage of traffic carried by these four streets remained consistent.

The FHWA transportation analysis includes an assessment of potential effects of the security action and the traffic management responses on the transportation system beyond the immediate vicinity of the changes. This analysis was performed to determine whether drivers would make large diversions in their travel patterns to avoid the area where the vehicular traffic restriction is in effect. Only insignificant effects would be found beyond the extended study area, which was the same area analyzed in this EA.

Table 2-3
Changes in Traffic Volumes on Primary North-South Streets ^{1/}

Street	Before ^{2/}		After		Change	
	AWT	Percent	AWT	Percent	AWT	Percent
11th Street	15.0	8.6%	16.0	9.2%	+ 1.0	+ 7.0%
12th Street	15.0	8.7%	15.3	8.8%	+ 0.3	+ 1.1%
13th Street	19.3	11.1%	10.9	6.1%	-8.4	-43.3%
14th Street	31.0	17.9%	37.6	21.7%	+ 6.6	+ 21.2%
15th Street	15.0	8.7%	14.4	8.3%	-0.6	-4.6%
17th Street	24.0	13.8%	26.0	15.0%	+ 2.0	+ 8.7%
18th Street	15.3	8.8%	18.9	10.9%	+ 3.6	+ 23.9%
19th Street	13.0	7.5%	18.0	10.4%	+ 5.0	+ 38.7%
20th Street	17.0	9.8%	9.0	5.2%	-8.0	-47.1%
21st Street	<u>8.8</u>	<u>5.1%</u>	<u>7.3</u>	<u>4.2%</u>	-1.5	-17.7%
Total	173.4	100.0%	173.4	100.0%		

AWT average weekday traffic volume in thousands
^{1/} Between New York and Pennsylvania Avenues
^{2/} Adjusted to 1995 traffic conditions

2.2.2.2 Analysis of Impacts on Traffic Operations

The ability of a street system to accommodate the traffic demand upon it is expressed as the level of service (LOS). The FHWA transportation analysis calculated levels of service based upon average travel times along streets in the extended study area. This method of calculating LOS is appropriate in an urban center. Where intersections are close together, their operation affects each other, and LOS cannot be calculated using the traffic volumes at individual intersections or on street segments. Levels of service must be calculated in a way that reflects the interaction of different parts of the street system.

For the FHWA analysis, travel-time speed-and-delay studies were performed to calculate the level of service on 14 east-west and north-south streets in the extended study area during the summer of 1995. Travel-speed data could be collected only for conditions after the security action and the traffic management responses; no travel-speed data exist for conditions before the security action and traffic management responses. Because levels of service could not be calculated for the conditions before the security action and traffic management responses, comparisons between the levels of service before and after the security action and the traffic management responses cannot be made.

Level of service describes traffic operations using letter grades from *A* through *F*. *LOS A*, the highest level, describes free-flowing operations at average travel speeds, where vehicles are completely unimpeded in their ability to maneuver in the traffic stream. *LOS B* represents reasonably unimpeded operations at average travel speeds, where the ability to maneuver

within the traffic stream is only slightly restricted and the stopped delays at intersections are not bothersome. *LOS C* represents stable operation, but the ability to maneuver and change lanes may be more restricted and average travel speeds are about 50 percent of the average free-flow speed. In *LOS D*, small increases in flow may cause substantial increases in delay, and reductions in speed. *LOS E* is characterized by substantial delays and average travel speeds of one-third the average free-flow speed or less. A street operates at *LOS E* when traffic volumes are approximately equal to the street's traffic capacity. *LOS F* characterizes traffic flow at extremely low speeds below one-third to one-quarter of the average free-flow speed, with high delays and extensive queuing at intersections. Traffic demand on a street operating at *LOS F* exceeds the street's traffic capacity.

In urban centers such as Washington's, some congestion is both normal and inevitable. Standard traffic engineering practice considers *LOS E* or better to be acceptable even though *LOS E* represents at-capacity operation. *LOS F* is undesirable.

Table 2-4 defines the relationship between level of service and average through vehicle speed on streets that have a 25 mile-per-hour speed limit, which is defined as arterial class III. All non-posted streets in the District of Columbia are to operate at 25 miles per hour. None of the primary streets in downtown Washington was observed to have a posted speed limit.

Table 2-4
Relationship of Street Level of Service to Average Travel Speed, Arterial Class III

Level of Service	Average Speed (mph)
A	≥25
B	≥19
C	≥13
D	≥9
E	≥7
F	< 7

Source: *Highway Capacity Manual, 3rd Edition, Updated 1994*

The data collected in the travel-time speed-and-delay studies were used to calculate average travel speed, total travel times, and average stopped delay (defined as the time when a vehicle is traveling less than five miles per hour). The average travel speeds were used to calculate levels of service for the morning peak period, the midday period and the afternoon peak period, which are shown in Table 2-5.

Figures 2-3 through 2-5 illustrate the level of service by street segment for each of the periods.

Table 2-5
Summary of Street Levels of Service Based Upon Travel Speed

<u>Street</u>	<u>A.M. Peak Period</u>	<u>Mid-Day Period</u>	<u>P.M. Peak Period</u>
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	Speed (MPH)	LOS	Speed (MPH)	LOS	Speed (MPH)	LOS
Constitution Avenue Eastbound						
23rd St. to 17th St.	31.1	A	21.3	B	14.9	C
17th St. to 12th St.	17.5	C	20.1	B	14.3	C
Constitution Avenue Westbound						
12th St. to 17th St.	14.9	C	29.9	A	14.5	C
17th St. to 23rd St.	26.1	A	29.1	A	15.9	C
E Street Eastbound						
20th St. to 17th St.	6.8	F	9.4	D	5.7	F
17th St. to 15th St.	25.0	A	20.5	B	5.0	F
E Street Westbound						
17th Street to 20th Street	16.8	C	16.3	C	12.0	D
(E) Pennsylvania Avenue Eastbound						
15th St. to 12th St.	18.3	C	16.9	C	7.2	E
(E) Pennsylvania Avenue Westbound						
12th St. to 15th St.	13.8	C	14.7	C	18.1	C
(W) Pennsylvania Ave Eastbound						
22nd St. to 17th St.	8.0	E	18.6	C	12.4	D
(W) Pennsylvania Ave Westbound						
17th St. to 22nd St.	10.8	D	9.7	D	12.7	D
H Street						
Penn. Ave. to 16th St.	7.5	E	12.4	D	15.5	C
16th St. to New York Ave.	14.2	C	18.2	C	4.0	F
I Street						
New York Ave. to 16th St.	5.1	F	5.5	F	11.4	D
16th St. to Penn. Ave.	8.0	E	3.7	F	5.5	F
K Street Eastbound						
21st St. to 16th St.	8.6	E	8.4	E	4.0	F
16th St. to 11th St.	9.9	D	10.3	D	10.6	D
K Street Westbound						
11th St. to 16th St.	11.8	D	10.6	D	8.7	E
16th St. to 21st St.	9.3	E	11.0	E	11.6	D
L Street						
23rd St. to Conn. Ave.	9.9	D	6.7	F	7.5	E

Street	A.M. Peak Period		Mid-Day Period		P.M. Peak Period	
	Speed (MPH)	LOS	Speed (MPH)	LOS	Speed (MPH)	LOS
Conn. Ave. to 12th St.	17.3	C	10.4	D	8.6	E
M Street						
14th St. to Conn. Ave.	9.2	D	8.0	E	12.3	D
Conn. Ave. to 23rd St.	21.0	B	9.9	D	13.2	C
13th Street Northbound						
Penn. Ave. to New York Ave.	6.1	F	7.0	F	11.6	D
New York Ave. to K St.	18.8	C	9.3	D	7.0	F
K St. to Mass. Ave.	8.4	E	12.0	D	21.1	B
13th Street Southbound						
Mass. Ave. to K St.	6.9	F	8.2	E	7.2	E
K St. to New York Ave.	6.1	F	6.3	F	10.0	D
New York Ave. to Penn. Ave.	14.5	C	17.7	C	9.9	D
14th Street Northbound						
Const. Ave. to Penn. Ave.	8.0	E	10.9	D	14.3	C
Penn. Ave. to New York Ave.	4.8	F	9.6	D	17.4	C
New York Ave. to K St.	7.1	E	10.4	D	9.9	D
K St. to Thomas Circle	7.8	E	15.8	C	9.1	D
14th Street Southbound						
Thomas Cir. to K St.	8.6	E	14.4	C	9.3	D
K St. to New York Ave.	7.8	E	12.5	D	8.3	E
New York Ave. to Penn. Ave.	8.8	E	7.8	E	5.5	F
Penn. Ave. to Const. Ave.	19.5	B	12.8	D	12.0	D
15th Street and Vermont Avenue Northbound						
Const. Ave. to Penn. Ave.	16.0	C	12.1	D	12.4	D
Penn. Ave. to New York Ave.	8.6	E	8.8	E	19.4	B
New York Ave. to K St.	7.0	F	8.6	E	7.5	E
K St. to Thomas Circle	6.4	F	11.6	D	11.2	D
15th Street Southbound						
New York Ave. to Penn. Ave.	10.7	D	10.5	D	13.3	C
Penn. Ave. to Const. Ave.	13.6	C	13.4	C	15.3	C
17th Street and Connecticut Avenue Northbound						
Const. Ave. to New York Ave.	6.8	F	17.0	C	14.7	C
New York Ave. to Penn. Ave.	10.7	D	17.9	C	10.4	D
Penn. Ave. to I St.	7.0	E	6.0	F	12.2	D
I St. to K St.	17.3	C	13.4	C	2.5	F
K St. to M St.	7.9	E	8.0	E	11.8	D
17th Street and Connecticut Avenue Southbound						

<u>Street</u>	<u>A.M. Peak Period</u>		<u>Mid-Day Period</u>		<u>P.M. Peak Period</u>	
	Speed (MPH)	LOS	Speed (MPH)	LOS	Speed (MPH)	LOS
M St. to K St.	7.0	E	9.7	D	8.0	E
K St. to I St.	13.2	C	3.9	F	3.7	F
I St. to Penn. Ave.	7.3	E	8.2	E	4.2	F
Penn. Ave. to New York Ave.	14.1	C	10.1	D	11.1	D
New York Ave. to Const. Ave.	19.0	C	6.6	F	15.6	C
18th Street						
Const. Ave. to New York Ave.	20.9	B	14.4	C	20.9	B
New York Ave. to Penn. Ave.	7.6	E	12.2	D	10.1	D
Penn. Ave. to K St.	8.6	E	7.1	E	12.8	D
K St. to M St.	8.1	E	12.2	D	9.4	D
19th Street						
M St. to K St.	13.0	D	6.0	F	6.0	F
K St. to Penn. Ave.	12.7	D	6.3	F	6.1	F
Penn. Ave. to E St.	15.1	C	13.2	C	22.3	B
E. St. to Const. Ave.	14.5	C	29.1	A	18.4	C

MPH - Miles per hour
 LOS - Levels of service

Figure 2-3: Street Levels of Service After Security Action and the Traffic Management Responses - AM Peak Period

Figure 2-4: Street Levels of Service After Security Action and the Traffic Management Responses - Midday Period

Figure 2-5: Street Levels of Service After Security Action and the Traffic Management Responses - PM Peak Period

Traffic Conditions in the Extended Study Area

Based on observation and available pre-action data, there were traffic operations problems on streets in the extended study area before the security action. The shift in traffic caused by the security action worsened those problems, especially on the east-west streets that gained traffic. The change in traffic volumes can be estimated from available data, but the effect on operations problems cannot, because the performance of an urban street system where intersections are close together is a complex function of more than traffic volumes alone. The degree to which the security action and the traffic management responses contributed to traffic operations problems cannot be determined.

Even though the east-west streets were most affected by the security action, changes in traffic also affect the north-south streets. Changes on the east-west streets would cause shifts in overall travel patterns that would increase or decrease traffic volumes on north-south streets, as drivers changed their travel paths through downtown. The streets interact as a system; changes that directly affect one part of that system can also generate effects in other parts of the system.

For east-west streets, the travel-time speed-and-delay studies and observations identified these conditions after the security action and the traffic management responses:

- **M Street** East of Connecticut Avenue, levels of service on M Street range from D to the high end of E during the three time periods. West of Connecticut Avenue, the level of service is better in each period, ranging from B to D. In each segment, the worst conditions occur in the midday period.
- **L Street** During the morning peak period, vehicles traveling on L Street have levels of service C and D. During the midday period, the loss of two travel lanes because of on-street parking and double-parked commercial vehicles reduces the effectiveness of the two remaining through lanes, resulting in LOS E, at-capacity traffic conditions.

Traffic in the afternoon peak period operates at LOS E, at-capacity conditions, all along this street. Because the congestion on eastbound K Street during the afternoon peak hours, some vehicles probably have diverted to L Street. The L Street average travel speed is marginally faster than the eastbound K Street travel speed.

- **K Street** Both directions of travel are at LOS D or worse during the three time periods. Eastbound afternoon travel between 21st and 16th Streets typically has the worst congestion, reaching LOS F. Left-turn movements from K Street to 17th Street (East) and bus circulation between Connecticut Avenue and 17th Street (East) contribute to the overall low travel speeds and high amounts of stopped delays.
- **I Street** Vehicles traveling on I Street between New York Avenue and Pennsylvania Avenue have the slowest travel speeds and very high stopped delays during all time

periods. Overall travel speeds considering stopped delays are typically less than 10 miles per hour and levels of service are D or worse. During the midday period, the average stopped time is 70 percent of the total trip time. This high delay is typically due to commercial vehicles double parking on I Street, resulting in the loss of a travel lane. Midday travel on I Street is slower than during the morning and afternoon peak periods.

- **H Street** H Street between Pennsylvania Avenue and 16th Street operates at LOS E or better during all periods. Between 16th Street and New York Avenue, H Street operates at level of service F in the afternoon peak period. Most of the delay and low travel speeds during this time period are at the 14th Street and New York Avenue intersection.
- **Constitution Avenue** Average levels of service are C or better in both directions during the three time periods. However, westbound traffic in the two travel lanes destined to the Arlington Memorial Bridge via Henry Bacon Drive experience lower levels of service during the afternoon peak period.

For the key north-south streets, too, some operational problems existed previously. The degree to which the security action and the traffic management responses contribute to the problems cannot be determined because of lack of data on conditions before the security action. The travel-time speed-and-delay studies and observation identified these conditions after the security action and the traffic management responses:

- **19th Street** Southbound traffic on 19th Street north of Pennsylvania Avenue operates at LOS D during the morning peak period. Traffic leaving downtown during the midday and afternoon peak periods experiences LOS F. Conditions are better south of Pennsylvania Avenue, LOS C or better.
- **18th Street** Northbound traffic on 18th Street north of New York Avenue is at LOS E during the morning peak period, LOS D and E during the midday period, and LOS D during the afternoon peak period.
- **17th Street** Traffic on 17th Street and Connecticut Avenue operates at LOS C or worse in all three periods. In the morning peak period, northbound 17th Street between Constitution Avenue and New York Avenue operates at LOS F. In the midday period, northbound traffic between Pennsylvania Avenue and I Street and southbound traffic between New York Avenue and Constitution Avenue operate at LOS F. In the afternoon peak period, northbound traffic between I and K Streets and southbound traffic between K Street and Pennsylvania Avenue operates at LOS F.
- **15th Street** Southbound traffic south of New York operates at LOS D or better during all time periods. At the time the post-action data were collected, the one-way northbound section of 15th Street between New York Avenue and K Street operated

at LOS F in the morning peak period. The section of 15th Street between New York Avenue and H Street was later changed to two-way operation.

- **14th Street** LOS E generally exists in both directions during the morning peak period, although the northbound section between Pennsylvania Avenue and New York Avenue is at LOS F. LOS C, D and E exist during the midday period. During the afternoon peak period, northbound traffic operates at LOS C and D and southbound traffic operates at LOS D and E, except for the section between New York and Pennsylvania Avenues, which is at LOS F. During all time periods, motorists traveling southbound on 14th Street between New York Avenue and Pennsylvania Avenue experience the lowest travel speeds and the longest stopped delays.
- **13th Street** At least one section of 13th Street is at LOS F in each time period. In the morning peak period, northbound traffic from Pennsylvania Avenue to New York Avenue and southbound traffic from Massachusetts Avenue to New York Avenue are at LOS F. In the afternoon peak period, only northbound traffic from New York Avenue to K Street is at LOS F.

2.2.2.3 Analysis of Impacts on Tour Buses

The FHWA transportation analysis found that the tour-bus operators who provided information said that they had previously used Pennsylvania Avenue north of the White House as a location to provide views and photograph opportunities of the White House, and so had to change the locations for their operations in the area. Because there was no advance notice of the security action, the tour-bus operations were temporarily disrupted. Each operator had to devise new operating plans on short notice. Initially, all operations were slowed by the traffic congestion that resulted from the change, but the June traffic management response addressed this problem. However, operators stated that H and I Streets where they can now operate are too far away to provide good views of the White House.

The security action and the traffic management responses increased the need for tour-bus parking. Some operators previously dropped tourists off on one side of Lafayette Park and then drove the buses around to the opposite side of the park while the tourists walked across it. Because Pennsylvania Avenue is no longer usable for buses, they must now wait in one location while people walk around the park. Tour operators reported different degrees of difficulty in finding parking locations. They reported parking on H Street and on 15th Street south of Pennsylvania Avenue, although tour bus parking on H Street is illegal. Long term tour bus parking needs should be addressed in a long term comprehensive plan that examines all tour bus requirements in the downtown area.

Many of the operators noted that their business volumes were lower during the summer of 1995 than they had been the previous summer, but most noted that the tourist industry in Washington had a generally slow summer and that it would be impossible to determine whether the security action had any effect on business volumes. Only one operator claimed that

the action had directly caused a loss of business.

2.2.2.4 Analysis of Impacts on Public Transportation

The FHWA transportation analysis cites several effects upon the public transportation system caused by the security action. One was the need to move Metrobus routes to different streets because of both the security action and the traffic management responses. Another was the need to change bus stop locations because of route relocations and changes in street direction. A third was the changes in terminal locations and operations. Finally, there was the effect of changed traffic patterns and congestion levels upon running times and bus turning movements. The security action had no direct effect upon the Red, Orange and Blue lines of the Metrorail system, as they are entirely underground in the extended study area. Information in the FHWA report describing public transportation characteristics was obtained from the WMATA and through field observations.

Major modifications were made in bus route locations at two times, first at the time of the security action and immediate traffic management response, when buses routes were removed from Pennsylvania Avenue, and again when the June traffic management response was implemented. The second major modification, necessitated by the June traffic management response's new one-way street pattern, changed 25 routes, including both those that had been shifted to H Street because of the security action and other routes that had originally used H and I Streets. WMATA information indicates that these routes accounted for 1,240 bus trips on each weekday, 816 on Saturday, and 607 on Sunday. Other smaller changes were made later so that buses could avoid a congested location and take advantage of changes in street improvements.

The routes that had followed Pennsylvania Avenue past the White House were the most dramatically changed. These routes are 30, 32, 34, 35, and 36, which operate between Friendship Heights in Northwest Washington and Hillcrest, Naylor Gardens, and Shipley Terrace in Southeast Washington. These routes are part of the core bus system with frequent service. Together, they have an average five-minute frequency during the weekday morning peak hour; even on Saturdays, they operate at a ten-minute frequency during the day. The routes were shifted to use the one-way pair of H and I Streets.

Another route that used Pennsylvania Avenue was Route 81, a variation on Route 80. Route 80 is also a core bus route that has high service levels; Route 81 was initially moved to H and I Streets and was subsequently consolidated into the basic route that operates in both directions on K Street.

Routes P17, P19, and W13 provide commuter service from the western part of southern Prince George's County. They operate only inbound in the morning and outbound in the evening, but have frequent service during the times that they operate. They operated westbound only on Pennsylvania Avenue; that movement was relocated to I Street.

Route X2 which used Madison Place and Pennsylvania Avenue between Madison Place and

15th Street also had to be rerouted.

Routes that originally used H or I Streets also had to be reconfigured because of the change in street direction in the June traffic management response. For example, Route 42, another route with high levels of service, previously followed H Street in both directions between 10th and 17th Streets. Route 42 continued to use H Street for the eastbound movement but the westbound movement was shifted to I Street. Routes S2, S3, S4, and S5, also part of the core bus system, previously operated westbound on H Street and eastbound on I Street between 11th and 16th Streets. With the change in direction of the streets, the operation of these routes was reversed to be westbound on I Street and eastbound on H Street.

A portion of the affected routes end in the extended study area, with a small loop at the end of the route so that the buses can turn around for the return trip. Some of those loops ran for only a block or two on H Street or I Street. These loops were modified to reflect the changes in street direction, with little effect upon the overall operation of the routes.

Some of the relocated routes are longer than the routes had been before the security action, some are shorter, and a few are the same length. The net effect of the route changes is an overall increase in bus miles operated, in part because the routes that were lengthened are ones with high service levels. WMATA calculated the net increase resulting from the changes in street operations on H and I Streets to be 16,800 bus miles per year. The rerouting to avoid 14th and H Streets added another 2,300 bus miles per year. WMATA calculated the increased Metrobus operating cost to the District of Columbia to be approximately \$314,000 per year.

The changes in street operation required the relocation of some bus stops. The biggest changes were on I Street, where the June traffic management response included the reversal of the direction of traffic operation. Bus operations were switched to the opposite side of the street, requiring new stops to be created where none had been. WMATA was able to identify locations for new stops and to establish them without difficulty. The new stop locations are similar in character and accessibility to the previous locations. DCDPW estimated the one-time costs to the District of Columbia of relocating passenger-waiting shelters at stops to be approximately \$40,000.

The FHWA analysis noted that, according to WMATA, the routes that were affected by the security action carry about 11,000 riders on a typical day, so the changes in Metrobus services had the potential to affect a large number of bus riders. Moving routes could make them more or less convenient, closer to or farther from Metrorail stations and other places to and from which people want to travel. Increases in travel time because of changes in routes or increases in traffic congestion could reduce the convenience of transit use. Because of concerns over the effect of the bus-route changes, WMATA monitored the ridership on affected routes after the changes. According to the FHWA transportation analysis, WMATA staff reported that there were changes in ridership, but the effect of the changes in street operations could not be separated from other factors that would also affect ridership volumes.

2.2.2.5 Analysis of Impacts on Parking

The FHWA transportation analysis noted that there are 49 fewer on-street parking meters after the security action and the traffic management responses than before. Taking into account the amount of time each day that the meters would have been in effect, there are 1,203 less space-hours per week because of the changes. An inventory of the meters is reproduced from the FHWA transportation analysis in Table 2-6.

The DCDPW, Bureau of Parking Services, reports that the average downtown parking meter generates revenues of approximately \$40 per week, with meters in use from Monday through Saturday, excluding ten weekday federal holidays. The average annual revenue per downtown parking meter is approximately \$2,000. Therefore, the loss of 49 parking spaces will reduce annual revenue to the District of Columbia by approximately \$98,000.

Information about off-street parking impacts was gathered for the FHWA transportation analysis through telephone interviews with five of the twelve major parking operators that were identified as operators of off-street parking lots or garages in the vicinity of the White House. They indicated a range of perceived impacts from "considerable business losses" to "no change" to "some increase in business." Parking operators with facilities on H Street complained about the loss of two-way travel and the loss of business from the east.

None of the parking operators contacted was willing to share detailed financial records describing before and after conditions. Based on this response and the unavailability of transaction data, the gains or losses for off-street parking businesses cannot be quantified.

Table 2-6

Comparison of the Number of Parking Meters and Metered Space Hours Per Week (6 days) Before and After the Security action and the Traffic Management Responses

Street Segment Between	Before		After		Difference	
	# of Spaces	Space Hours Per Week	# of Spaces	Space Hours Per Week	# of Spaces	Space Hours Per Week
15th Street						
K Street & I Street ^{1/}	22	819	22	1,149	0	330
I Street & H Street	16	624	16	804	0	180
H Street & PA/NY Avenue	25	975	25	1,725	0	750
I Street						
11th Street & 12th Street	4	216	3	162	-1	-54
12th Street & 13th Street	20	990	20	990	0	0
13th Street & 14th Street	35	2,250	25	1,575	-10	-675
14th Street & 15th Street	23	897	23	897	0	0
15th Street & Vermont Avenue	15	585	11	429	-4	-156
Vermont Avenue & 16th Street	15	585	10	390	-5	-195
16th Street & Connecticut Avenue	23	897	21	819	-2	-78
Connecticut Avenue & 17th Street	8	312	0	0	-8	-312
17th Street & 18th Street	28	1,092	22	858	-6	-234
18th Street & 19th Street	25	1,365	23	897	-2	-468
19th Street & 20th Street	20	1,050	18	972	-2	-78
20th Street & 21st Street	30	1,785	25	1,440	-5	-345
Pennsylvania Avenue						
15th Street & Madison Place	3	135	6 ^{2/}	270	(+ 3)	135
H Street						
13th Street & 14th Street	4	156	4	156	0	—
14th Street & 15th Street	16	624	16	624	0	—
15th Street & 16th Street	0	—	0	—	—	—
16th Street & Connecticut Avenue	0	—	0	—	—	—
Connecticut Avenue & 17th Street	0	—	0	—	—	—
17th Street & 18th Street	13	507	8	312	-5	-195
18th Street & 19th Street	<u>14</u>	<u>546</u>	<u>12</u>	<u>738</u>	<u>-2</u>	<u>192</u>
Total	359	16,410	310	15,207	-49	-1,203

Street	Before		After		Difference	
Segment Between	# of Spaces	Space Hours Per Week	# of Spaces	Space Hours Per Week	# of Spaces	Space Hours Per Week

^{1/} Includes ten motorcycle parking spaces

^{2/} Parking was later reconfigured in this area to add two more spaces, for a total of eight.